Whole-building Design Increases Energy Efficiency in a Mixed-Humid Climate

Ideal Homes — Norman, Oklahoma

Building America is sponsored by the U.S. Department of Energy. The program aims to:

- Reduce energy use by 50% and reduce construction time and waste
- Improve indoor air quality and comfort
- Encourage a systems-engineering approach for design and construction of new homes.
- Develop system cost/performance tradeoffs that improve housing quality and performance without increasing cost.
- Conduct cost-shared research to accelerate development and adoption of innovative building systems.

New houses designed by Ideal Homes, with technical support from the U.S. Department of Energy's Building America Program, save their homeowners money by applying the principles of "whole-building" design, which considers the house as a complete system instead of separate components. This approach benefits homeowners by reducing construction costs, assuring system performance, addressing health and safety concerns, and allowing builders to install downsized heating and cooling equipment, which lowers utility bills. Ideal Homes has re-engineered its homes to reduce space conditioning energy use by 30%–40% while increasing indoor air quality and thermal comfort throughout the home.

Building America wall system choices for Ideal homes include recycled loose fill insulation, which fills the voids in the wall frame and reduces unwanted air leakage through the building envelope. This insulation also improves the fire safety of the walls and minimizes noise from outside the home.

Ideal Homes selected the following energy efficient features in its effort to achieve Building America's space-conditioning performance goal.

- **High-performance solar load control windows**
- **Recycled loose-fill insulation**
- **Low-loss duct systems**
- **Downsized AC systems**
- **Controlled ventilation systems**

Home ventilation is improved by continuously mixing fresh air with recirculating interior air. Indoor air quality is substantially improved by virtually eliminating fumes from paints and adhesives during construction.

Ideal Homes is working with the Building Science Consortium (BSC), one of the five Building America industry teams. Ideal Homes is a lead regional builder, building about 300–400 homes a year in metropolitan Oklahoma City. All Building America houses built by Ideal Homes receive an Energy Star label that certifies the performance rating of these houses is at least 30% better than the Energy Star reference house based on the Model Energy Code. The Energy Star program is a joint effort of the U.S. Department of Energy and the Environmental Protection Agency.

BUILDINGS FOR THE 21ST CENTURY

Buildings that are more energy-efficient, comfortable, and affordable ... that's the goal of DOE's Office of Building Technology, State and Community Programs (BTS). To accelerate the development and wide application of energy efficiency measures, BTS:

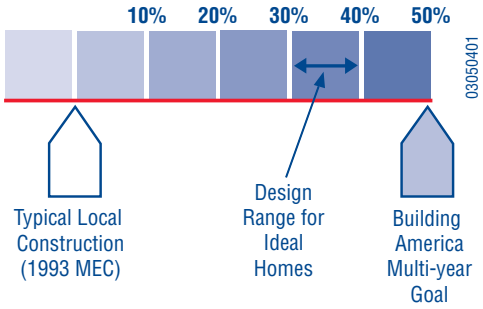
- Conducts R&D on technologies and concepts for energy efficiency, working closely with the building industry and with manufacturers of materials, equipment, and appliances
- Promotes energy-/money-saving opportunities to both builders and buyers of homes and commercial buildings
- Works with state and local regulatory groups to improve building codes, appliance standards, and guidelines for efficient energy use
- Provides support and grants to states and communities for deployment of energy-efficient technologies and practices.

The Approach

Building America's systems-engineering approach unites segments of the building industry that have traditionally worked independently of one another. It forms teams of architects, engineers, builders, equipment manufacturers, material suppliers, community planners, mortgage lenders, and contractor trades. More than 230 different companies make up the five Building America consortium:

- Building Science Consortium (BSC)
- Consortium for Advanced Residential Buildings (CARB)
- Hickory Consortium
- Industrialized Housing Partnership.
- Integrated Building and Construction Solutions (IBACOS) Consortium

Building America Performance Goal
(Heating and Cooling Energy Savings)



The teams design houses from the ground up, considering the interaction between the site, building envelope, mechanical systems, and other factors. With this approach, the teams can incorporate energy-saving strategies at little or no extra cost.

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